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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,728	10/31/2003	Matthew L. Seidl	SUN-P9543-SPL	1581

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EXAMINER
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MOORE, PATRICK M

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/698,728

**Applicant(s)**

SEIDI ET AL.

**Examiner**

Patrick M. Moore

**Art Unit**

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 1, 11 & 21 have been amended.

#### *Response to Amendment*

2. The arguments and amendment filed one **23 February 2006**, in response to the Office Action mailed on **29 December 2005** have been fully considered, with the result that follows. Examiner understands that support exists for the amended claims in ¶0036-0038 of Applicant's original specification.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 6-14 & 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nguyen** et al. (US Patent # 5,887,275), in view of **Mattis** et al. (US Patent # 6,128,623), herein **Nguyen** and **Mattis**, respectively.

- a. **As per Claim 1**, **Nguyen** discloses a method for accessing objects stored outside of main memory in an object-addressed memory hierarchy, comprising: receiving a request to access an object, wherein the request includes an object identifier for the object that is used to reference the object within the object-addressed memory hierarchy [**Column 3, Lines 43-55**]; using the object identifier to retrieve an object table entry associated with the object, wherein the object table entry associates a given object identifier with a corresponding

physical address if the object is in main memory [**Figure 7, # 704, 706 & Column 10, Lines 33-39**]; examining a valid indicator within the object table entry [**Figure 6, # 622 & Column 7, Lines 32-35**]; if the valid indicator indicates the object is located in main memory, using a physical address in the object table entry to access the object in main memory [**Figure 7, # 700, 716, 718, 714 & Column 10, Lines 47-56**]; and if the valid indicator indicates that the object is not located in main memory, relocating the object into memory from a location outside of memory, and then accessing the object in main memory [**Figure 6, #610 & Column 9, Lines 36-49**]. *Examiner understands the combination of the "pseudo-timestamp" [per Column 7, Lines 32-35] and setting the Virtual Memory Address to NULL [per Column 6, Lines 16-28] provide indication as to whether the referenced object is stored in main memory or not stored in main memory.*

- b. **Nguyen** does not expressly disclose retrieving objects from external locations, but **Mattis** discloses an external object retrieval method. Therefore, **also per Claim 1, Mattis** discloses retrieving the object table entry when the object table entry associates a given object identifier with an external location if the object is not in main memory [**Column 10, Lines 12-18**]. *Nguyen and Mattis are analogous art because they come from the same field of endeavor: cache memory optimization. At the time of invention, it would have been obvious for one of ordinary skill in the art to combine the global identifiers and virtual addressing, as disclosed by Nguyen, with the remote object caching techniques,*

*as disclosed by **Mattis**. The suggestion/motivation for doing so would have been for the benefit of providing a higher-performance, higher-load object cache, as taught by **Mattis** in **Column 4, Lines 48-63**.*

- c. **As per Claim 2, Nguyen** further discloses the method of claim 1, wherein the request to access the object is received at a translator that translates between object identifiers (used to reference objects in an object cache) and physical addresses (used to address objects in main memory) [**Figure 7, # 708, 710 & Column 7, Lines 64-67 and Column 8, Lines 1-9**].
- d. **As per Claim 3, Nguyen** further discloses the method of claim 2, wherein prior to receiving the request at the translator, the request is initially directed to the object cache [**Figure 7, # 700**]; wherein if the request causes a hit in the object cache, the object is accessed in the object cache and the request is not sent to the translator [**Figure 7, “No” branch of # 700, 716, 718 & 714**]; and wherein if the request causes a miss in the object cache, the request is sent to the translator [**Figure 7, “Yes” branch of # 700, 702 & Column 10, Lines 20-36**].
- e. **As per Claim 4, Nguyen** further discloses the method of claim 1, wherein relocating the object into main memory involves using location information from the object table entry to determine the location of the object outside of main memory [**Figure 7, # 704 & Column 10, Lines 33-39**].
- f. **As per Claim 6, Nguyen** further discloses the method of claim 4, wherein the location information is overloaded into a physical address field in the object table entry [**Figure 7, # 704 and Figure 2, # 210**].

- g. **As per Claim 7, Nguyen** further discloses the method of claim 1, wherein relocating the object into main memory involves causing an object fault handler to execute in a central processing unit (CPU) to relocate the object into main memory [**Column 2, Lines 44-46**]. *Examiner understands the disclosed "DBMS" to be one such object fault handler.*
- h. **As per Claim 8, Nguyen** further discloses the method of claim 1, wherein relocating the object into main memory involves overlapping retrieval of multiple objects into main memory from locations outside of main memory [**Figure 6, # 606, 608, 610 & Column 9, Lines 41-44**].
- i. **As per Claim 9, Nguyen** further discloses the method of claim 1, wherein after relocating the object into main memory, the method further comprises: updating the valid indicator to specify that the object is located in main memory [**Figure 7, #712**]; and updating the physical address in the object table entry to specify the location of the object in main memory [**Figure 7, # 710 & Column 10, Lines 33-46**].
- j. **As per Claim 10, Nguyen** further discloses the method of claim 1, wherein the object is defined within an object-oriented programming system [**Column 3, Lines 43-55**]. *As would be known to one of ordinary skill in the art, the language of Column 3, more specifically Lines 33-46, teaches that an object oriented programming system was used to obtain the invention as disclosed by Nguyen.*
- k. **As per Claim 11, Nguyen** discloses an apparatus that facilitates accessing objects stored outside of main memory in an object-addressed memory

hierarchy, comprising: a receiving mechanism configured to receive a request to access an object, wherein the request includes an object identifier for the object that is used to reference the object within the object-addressed memory hierarchy [**Column 3, Lines 43-55**]; a object table lookup mechanism configured to use the object identifier to retrieve an object table entry associated with the object, wherein the object table entry associates a given object identifier with a corresponding physical address if the object is in main memory [**Figure 7, # 704, 706 & Column 10, Lines 33-39**]; an access mechanism configured to, examine a valid indicator within the object table entry [**Figure 6, # 622 & Column 7, Lines 32-35**], if the valid indicator indicates the object is located in main memory, to use a physical address in the object table entry to access the object in main memory [**Figure 7, # 700, 716, 718, 714 & Column 10, Lines 47-56**], and if the valid indicator indicates that the object is not located in main memory, to relocate the object into memory from a location outside of memory, and to access the object in main memory [**Figure 6, #610 & Column 9, Lines 36-49**].

- l. **Also per Claim 11, Mattis** discloses retrieving the object table entry when the object table entry associates a given object identifier with an external location if the object is not in main memory [**Column 10, Lines 12-18**]. *Identical motivation exists to combine Nguyen with Mattis.*
- m. **As per Claim 12, Nguyen** further discloses the apparatus of claim 11, wherein the receiving mechanism is contained within a translator that translates between object identifiers (used to reference objects in an object cache) and physical

addresses (used to address objects in main memory) **[Figure 7, # 708, 710 & Column 7, Lines 64-67 and Column 8, Lines 1-9].**

- n. **As per Claim 13, Nguyen** further discloses the apparatus of claim 12, further comprising the object cache, wherein prior to receiving the request at the translator, the request is initially directed to the object cache **[Figure 7, # 700];** wherein if the request causes a hit in the object cache, the object is accessed in the object cache and the request is not sent to the translator **[Figure 7, “No” branch of # 700, 716, 718 & 714];** and wherein if the request causes a miss in the object cache, the request is sent to the translator **[Figure 7, “Yes” branch of # 700, 702 & Column 10, Lines 20-36].**
- o. **As per Claim 14, Nguyen** further discloses the apparatus of claim 11, wherein while relocating the object into main memory, the access mechanism is configured to use location information from the object table entry to determine the location of the object outside of main memory **[Figure 7, # 704 & Column 10, Lines 33-39].**
- p. **As per Claim 16, Nguyen** further discloses the apparatus of claim 14, wherein the location information is overloaded into a physical address field in the object table entry **[Figure 7, # 704 and Figure 2, # 210].**
- q. **As per Claim 17, Nguyen** further discloses the apparatus of claim 11, wherein while relocating the object into main memory, the access mechanism is configured to cause an object fault handler to execute in a central processing unit (CPU) to relocate the object into main memory **[Column 2, Lines 44-46].**



- r. **As per Claim 18, Nguyen** further discloses the apparatus of claim 11, wherein while relocating the object into main memory the access mechanism is configured to overlap retrieval of multiple objects into main memory from locations outside of main memory **[Figure 6, # 606, 608, 610 & Column 9, Lines 41-44]**.
- s. **As per Claim 19, Nguyen** further discloses the apparatus of claim 11, wherein after relocating the object into main memory, the access mechanism is configured to: update the valid indicator to specify that the object is located in main memory **[Figure 7, # 712]**; and to update the physical address in the object table entry to specify the location of the object in main memory **[Figure 7, # 710 & Column 10, Lines 33-46]**.
- t. **As per Claim 20, Nguyen** further discloses the apparatus of claim 11, wherein the object is defined within an object-oriented programming system **[Column 3, Lines 43-55]**.
- u. **As per Claim 21, Nguyen** discloses the computer system that facilitates accessing objects stored outside of main memory in an object-addressed memory hierarchy, comprising: a processor **[Figure 1, # 102]**; a main memory **[Figure 1, # 104]**; the object-addressed memory hierarchy **[Abstract, Lines 1-2 & Column 3, Lines 52-55]**; an object cache within the object-addressed memory hierarchy **[Figure 7, # 700 & Column 3, Lines 43-48]**; a translator that translates between object identifiers, used to address objects in the object cache, and physical addresses, used to address objects in main memory **[Figure 7, # 708,**

**710 & Column 7, Lines 64-67 and Column 8, Lines 1-9];** wherein the translator is configured to receive a request to access an object after the request misses in the object cache **[Figure 7, “Yes” branch of # 700, 702 & Column 10, Lines 20-36]**, wherein the request includes an object identifier for the object that is used to reference the object within the object-addressed memory hierarchy, and wherein the object table entry associates a given object identifier with a corresponding physical address if the object is in main memory **[Column 3, Lines 43-55 & Column 10, Lines 33-39]**; a object table lookup mechanism with the translator configured to use the object identifier to retrieve an object table entry associated with the object **[Figure 7, # 704, 706 & Column 10, Lines 33-39]**; and an access mechanism configured to, examine a valid indicator within the object table entry **[Figure 6, # 622 & Column 7, Lines 32-35]**, if the valid indicator indicates the object is located in main memory, to use a physical address in the object table entry to access the object in main memory **[Figure 7, # 700, 716, 718, 714 & Column 10, Lines 47-56]**, and if the valid indicator indicates that the object is not located in main memory, to relocate the object into memory from a location outside of memory, and to access the object in main memory **[Figure 6, #610 & Column 9, Lines 36-49]**.

- v. **Also per Claim 21, Mattis** discloses retrieving the object table entry when the object table entry associates a given object identifier with an external location if the object is not in main memory **[Column 10, Lines 12-18]**. *Identical motivation exists to combine Nguyen with Mattis.*

4. Claims 5 & 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US Patent # 5,887,275) in view of Mattis et al. (US Patent # 6,128,623) as applied to claims 1-4, 6-14 and 16-21 above, and further in view of Malcolm (US Patent # 6,427,187).

- a. **As per Claims 5 & 15, Nguyen** discloses the method of claims 4 & 14, wherein the location information can include: a secondary storage address for the object **[Figure 4, # 210, 202 & 208]**; and another (possibly different) object identifier associated with the object **[Figure 4, # 306, 302, 304 & 308]**. **Nguyen** does not expressly disclose the location as a network address for the object; a uniform (or universal) resource locator (URL) for the object; and a physical address for a compressed block of objects containing the object.
- b. However, **Malcolm** teaches loading "web objects" into the Cache System **[Figure 1, # 110]** of a Client/Server Devices in **Column 3, Lines 10-19** and **Lines 30-39**. Additionally, **Malcolm** discloses that the location information can include a network address via a "LAN (Local Area Network)" **[Column 4, Lines 6]**, a URL **[Column 8, Lines 6-10]** or a compressed block of data **[Column 6, Lines 25-30 & Column 9, Lines 24-27]**. Additionally, **Nguyen**, in view of **Mattis**, and **Malcolm** are analogous art because they are from the same field of endeavor: object-oriented handling of data blocks in cache memory.
- c. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the object-addressed cache as disclosed by **Nguyen** to use the inter-cache communication taught by **Malcolm** to obtain the invention as

specified in Claims 5 and 15. The suggestion/motivation for doing so would have been to maximize efficient data transfer, as taught by **Malcolm [Column 1, Lines 33-36]**, in an object based caching system.

### ***Response to Arguments***

5. Applicant's arguments with respect to **Claims 1, 11 & 21** have been fully considered but are moot in view of the new ground(s) of rejection. As described above, **Mattis** expressly discloses retrieving an object using "object or name keys" to reference remote data objects such as "a network address, or a URL" in **Column 10, Lines 10-24**. With respect to **Claims 2-10 & 12-20**, Applicant's arguments have been fully considered, but are not persuasive as they depend from **Claims 1, 11 & 21**, as rejected above.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

7. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick M. Moore whose telephone number is (571) 272-1239. The examiner can normally be reached on M-F 8:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PMM

Handwritten signature of Mano Padmanabhan in cursive script, with the date 5/15/06 written below it.

**MANO PADMANABHAN**  
**SUPERVISORY PATENT EXAMINER**